

Biological Opinion: Dos Condados-Hackberry-Morenci Transmission Lines

BIOLOGICAL OPINION SUMMARY

**TRANSMISSION STRUCTURE MODIFICATIONS AND RIGHT-OF-WAY
TRIMMING FOR THE DOS CONDADOS TO HACKBERRY AND THE
HACKBERRY TO MORENCI 230 KV TRANSMISSION LINES, GILA RIVER AREA,
GRAHAM COUNTY, ARIZONA**

Date of the opinion: December 4, 1997

Action agencies: Arizona Electric Power Cooperative, Inc.

Project: Stabilize power transmission structures to protect against flood damage, trim and clear vegetation to prevent power outages, construct access roads to transmission structures.

Location: Gila River area, approximately 5 km upstream of Solomon, Graham County, Arizona

Biological opinion:

Nonjeopardy - Southwestern willow flycatcher (*Empidonax traillii extimus*)

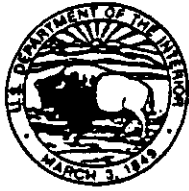
Incidental take statement:

Anticipated take: Permanent loss of some suitable habitat due to clearing, permanent modification of some suitable habitat due to trimming vegetation.

Reasonable and prudent measures: *Implementation of these measures through terms and conditions is mandatory.* Three objectives for minimizing take are given.

Terms and conditions: *Terms and conditions implement reasonable and prudent conditions and are mandatory.* All work will be performed between September 1 and April 15, surveys for southwestern willow flycatchers will be performed for a minimum of 3 years, disturbed areas will be re-seeded with native vegetation.

Conservation recommendations: *Implementation of conservation recommendations is discretionary.* Cooperate with adjacent landowners to protect non-federal reaches near the action area, including elimination of grazing in riparian areas, develop comprehensive plan addressing southwestern willow flycatcher concerns in areas of Arizona where AEPCO transmission lines cross flycatcher habitat, initiate and maintain cowbird trapping program in the action area.



United States Department of the Interior
Fish and Wildlife Service

Arizona Ecological Services Field Office
2321 W. Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
(602) 640-2720 Fax (602) 640-2730



In Reply Refer To:

AESO/SE
2-21-96-F-197

December 4, 1997

Ms. Carol Peters, Environmental Planner
Arizona Electric Power Cooperative, Inc.
P.O. Box 670
Benson, Arizona 85602-0670

Dear Ms. Peters:

The U.S. Fish and Wildlife Service (Service) has reviewed the project plans for the proposed transmission structure modifications and right-of-way trimming for the Dos Condados to Hackberry and the Hackberry to Morenci 230 KV transmission lines, located in the Gila River area, Graham County, Arizona. Your September 26, 1997, request for formal consultation was received on September 29, 1997. This document represents the Service's biological opinion on the effects of this action on the southwestern willow flycatcher (*Empidonax traillii extimus*) in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

This biological opinion is based on information provided in the September 1997 project proposal, the biological assessment of August 1996 prepared by SWCA, Inc., telephone conversations with Carol Peters (Arizona Electric Power Cooperative, Inc. (AEPCO)) and Tina Lee (SWCA), field investigations by Service personnel, the August 25, 1997, meeting between Service personnel and AEPCO personnel, and other sources of information. A complete administrative record of this consultation is on file in the Service's Arizona Ecological Services State Office, Phoenix, AZ.

Consultation history

The Service received a request for information on threatened and endangered species found in Graham County from Carol Peters (AEPCO) on March 11, 1996, and responded on March 12, 1997, with a list of possible species. The Service received another letter from C. Peters (dated June 12, 1996) on June 14, 1996, stating that AEPCO would be the designated lead in the Section 7 consultation process (federal funding from the Rural Utilities Service, U.S. Department of Agriculture). On October 10, 1996, the Service received the biological assessment prepared by SWCA, Inc. and the proposed project plans. The Service responded on February 20, 1997 by: (1) concurring with the finding of may affect, not likely to adversely affect the razorback sucker (*Xyrauchen texanus*); and (2) not concurring with the finding of may affect, not likely to adversely affect the southwestern willow flycatcher

(*Empidonax traillii extimus*). Carol Peters responded to a request by Sheldon Plentovich (Service) for more information by sending aerial photos and project-specific southwestern willow flycatcher survey forms (received March 05, 1997). Sheldon Plentovich and Rob Marshall from this office accompanied Carol Peters (AEPCO) and Ken Kertell (SWCA) on a site visit on March 19, 1997. C. Peters sent a letter (received March 31, 1997) informing the Service of plans to trim vegetation to a minimum clearance of 16' along the transmission line right of ways (ROWs); the Service had no opportunity to respond as a result of workload and staff changes. The Service received (May 6, 1997) a letter from Larry D. Huff (AEPCO) asking for reconsideration of the Service's "jeopardy" determination. On July 30, 1997, Bob Reed (Service) phoned Carol Peters to discuss the project, clarify misunderstandings, and obtain further information. On August 25, 1997, a meeting was held at the Service's field office in Phoenix; in attendance were Bob Reed and Angie Brooks (Service) and Carol Peters, Bill Wells, Gary Grim, John Lodzinski, and Jim Burson (AEPCO). Topics discussed were southwestern willow flycatcher biology and possible alternatives and modifications to the proposed action. On September 29, 1997 the Service received an amended project proposal and a request to initiate formal consultation.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

Arizona Electric Power Cooperative, Inc. (AEPCO) owns, operates, and maintains two 230 Kv transmission lines that cross the Gila River east of Safford, Graham County, AZ. The two transmission lines were originally built in the mid-1970's to supply power to the Morenci copper mine, and to supply power out of the proposed Hackberry substation. The two combined lines also serve as AEPCO's backup feed for the communities of Willcox, Duncan, Safford and Morenci should problems develop on the primary supply to these areas. The two lines also interconnect with transmission systems to the east.

Several transmission structures on both the Dos Condados to Hackberry and the Hackberry to Morenci transmission lines now lie within the Gila River channel, as a result of shifting of the river channel in the last 20 years. The integrity of these structures has been compromised by the river undermining their foundations. AEPCO is proposing that two structures on the Dos Condados to Hackberry line be reinforced by protecting them with rock filled gabion baskets and two of the structures on the Hackberry to Morenci line be reinforced with self-launching riprap which is designed to withstand the maximum anticipated current velocity.

Riparian vegetation has invaded the ROWs where the two lines cross the Gila River. This prevents access to transmission structures, can possibly cause power outages by vegetation contacting lines or conductors, and can possibly cause fires by vegetation approaching energized lines. AEPCO proposes to construct three access roads and institute a trimming and vegetation control project for the two transmission lines where they cross the Gila River.

Extensive modifications to the original project plans were agreed to by representatives of the Service and AEPCO at the above-mentioned meeting of August 25, 1997. The amended project description includes the following actions:

Dos Condados to Hackberry Line

The Dos Condados to Hackberry transmission line crosses the Gila River in the area of the north half of Section 17 and south half of section 8, Township 7 South, Range 27 East on the San Jose, Arizona 7.5 Minute Quadrangle Map. The transmission structures requiring modifications are M24 and M25. An access road and vegetation trimming are proposed along the ROW on the north side of the river between the two structures. All modifications and construction take place on private land.

Structure M24: Modifications to the structure include construction of a 72-foot by 86-foot by 1.5-foot oval of rock-filled gabion baskets (total volume 275 yards), along with installation of metal braces to allow for change-out of the structure. This structure will be accessed by an access road described below. No excavation or vegetation clearing is necessary around this structure.

Structure M25: Modifications to the structure include construction of an 88-foot diameter ring of gabion baskets (total volume 118 yards), 1.5-feet high, around the base of the structure. This structure will be accessed by an access road described below. A small wetland (deep puddle) will be filled around the base of the structure, and will be reconstructed nearby. A very minor amount of vegetation clearing is necessary around this structure.

Access Road Construction

A proposed access road will be constructed from approximately the Tidwell Canal to the edge of the vegetation on the north bank of the Gila River on the transmission line ROW. The access road is necessary for the gabion basket construction as well as for routine maintenance and line patrols. The road will be approximately 20 feet wide and 350 feet long, and will be constructed with bulldozer, graders, and/or loaders.

Right-of-Way Trimming

Vegetation trimming is proposed for the ROW north of Structure M25 to prevent outages and reduce the risk of fire. Vegetation will be trimmed to approximately 16 feet of clearance from the conductors the full width of the ROW, and trimming will be performed with a bucket truck from the access road. Trimming will be performed annually in late April, and possibly in late summer or early fall, depending on vegetation growth.

Hackberry to Morenci Line

The Hackberry to Morenci line crosses the Gila River near the center of section 3, Township 7 South, Range 27 East on the San Jose, Arizona 7.5 Minute Quadrangle Map. After

crossing the river channel in section 3, the line turns and travels due east and crosses over the southern tip of a meander scar approximately 2000 feet to the east in the center of Section 2. There are two structures that need to be modified with riprap: Structures L119 and L122. Access roads to these structures are proposed as well as vegetation trimming for the ROW north of Structure L123 and north and east of Structure L122. All modifications and construction take place on private land.

Structure L119

Modifications to the structure include construction of an oval of self-launching riprap, 86 feet by 66 feet by 6 feet (total volume 900 cubic yards), around the base of the structure and extending down the bank to the channel bottom. An existing ramp near the structure will be used to access the river channel. Very little vegetation removal is required.

Structure L122

Modifications to the structure include construction of a 116-foot diameter ring of self-launching riprap (total volume 1500 cubic yards) around the base of the structure. This area will be cleared of vegetation and driftwood by a bulldozer. Access will be from the south on a newly-constructed access road, described below.

Access roads

Two access roads will be constructed, one to each structure. The road to Structure L122 will be approximately 20 feet wide and 200 feet long, and will be constructed with a bulldozer. The road to Structure L123 will be approximately 20 feet wide and 200 feet long, and will also be constructed with a bulldozer. In addition, a 50-foot radius will be cleared around the latter structure to provide a safe working area and room for equipment.

Right-of-Way Trimming

Vegetation trimming is proposed for sections of this ROW to prevent outages and reduce the risk of fire. Trimming will be performed north of Structure L123, using a bucket truck from the access road to trim vegetation the full width of the ROW to a clearance of 16 feet from the conductors to the vegetation. Trimming will also be performed north of Structure L122 the full width of the ROW (a strip 100 feet wide and 250-300 feet in length). Finally, the 1000-foot stretch of the 100-foot wide ROW between Structures L121 and L122 will be trimmed. Trimming north and east of Structure L122 will be performed using hand tools from ladders, and vegetation will be trimmed as close to the 16 foot clearance as is safely possible. Trimming will be performed annually in late April, and possibly in late summer or early fall, depending on vegetation growth.

Construction timing and duration

The proposed project is expected to be completed during the last half of 1997 and the first half of 1998. The work is expected to take approximately 4 to 6 weeks to complete, including access road construction and transmission structure modifications.

Future maintenance activities

Structures M25 and L122 are steel lattice structures requiring little maintenance. Structures M24 and L119 are wooden double-pole H-frame structures; they are in good condition, and the proposed addition of metal braces to the base of these structures will facilitate changeout of the poles with minimal disturbance to the surrounding area. Structure L119 is accessible from the farm road, and so maintenance will be performed outside of the river channel. No maintenance to Structure L123 is anticipated in the near future, but construction of the access road to this structure will facilitate future maintenance.

Access road maintenance will mostly involve removal of new vegetation. The roads will be patrolled monthly during the summer months and every four months during the rest of the year. Vehicular traffic will probably preclude extensive regrowth of vegetation on the roads, but periodic grading may be necessary to remove ruts and vegetation.

Maintenance of gabion baskets and riprap structures is expected to be infrequent, but will be accomplished using both established roads and roads proposed in this action.

All maintenance of transmission structures and road and vegetation trimming on the ROWs will be conducted during the period from August 15 to May 1, so as to avoid activity during the breeding season for the southwestern willow flycatcher.

STATUS OF THE SPECIES (rangewide)

The southwestern willow flycatcher is a small passerine bird (Order Passeriformes; Family Tyrannidae) measuring approximately 15 centimeters (5.75 inches) in length from the tip of the bill to the tip of the tail and weighing only 11 grams (0.4 ounces). It has a grayish-green back and wings, whitish throat, light gray-olive breast, and pale yellowish belly. Two white wingbars are visible (juveniles have buffy wingbars). The eye ring is faint or absent. The upper mandible is dark, the lower is light yellow grading to black at the tip.

The southwestern willow flycatcher is an insectivore typically perching on a branch and making short direct flights, or sallying, to capture flying insects. The southwestern willow flycatcher is a riparian obligate, nesting along rivers, streams, and other wetlands where dense growths of willow (*Salix* sp.), *Baccharis*, buttonbush (*Cephalanthus* sp.), boxelder (*Acer negundo*), saltcedar (*Tamarix* sp.) or other plants are present, often with a scattered overstory of cottonwood (*Populus* sp.) and/or willow.

One of four currently-recognized willow flycatcher subspecies (Phillips 1948, Unitt 1987, Browning 1993), the southwestern willow flycatcher is a neotropical migratory species that breeds in the southwestern U.S. and migrates to Mexico, Central America, and possibly northern South America during the non-breeding season (Phillips 1948, Stiles and Skutch 1989, Peterson 1990, Ridgely and Tudor 1994, Howell and Webb 1995). The historical range of the southwestern willow flycatcher included southern California, Arizona, New

Mexico, western Texas, southwestern Colorado, southern Utah, extreme southern Nevada, and extreme northwestern Mexico (Sonora and Baja; Unitt 1987).

The States of California and New Mexico list the southwestern willow flycatcher as endangered (California Department of Fish and Game 1992, and New Mexico Department of Game and Fish 1988). The State of Arizona considers the southwestern willow flycatcher a species of special concern (Arizona Game and Fish Department 1996). The Service included the southwestern willow flycatcher on its Animal Notice of Review as a category 2 candidate species on January 6, 1989 (USFWS 1989). A proposal to list the southwestern willow flycatcher as endangered, with critical habitat, was published on July 23, 1993 (United States Fish and Wildlife Service 1993), and a final rule without critical habitat was published on February 27, 1995 (USFWS 1995), becoming effective on March 29, 1995. Following the review of comments received during the public comment period, the Service deferred the designation of critical habitat, invoking an extension on this decision until July 23, 1995. A moratorium on listing actions under the Act passed by Congress in April 1995 required the Service to cease work on the designation of critical habitat. On April 26, 1996, the moratorium was lifted and on May 16, 1996, the Service published a notice in the Federal Register announcing listing prioritization guidance. Listing actions were placed in categories of decreasing order of priority: Tier 1 - Emergency listings; Tier 2 - Finalization of listing decisions on proposed species; and Tier 3 - all other listing actions (proposed rules, petition findings, critical habitat designations). On May 13, 1997, the Southwest Center for Biological Diversity filed a lawsuit claiming that the Service violated the Act by not finalizing critical habitat for the southwestern willow flycatcher. On March 20, 1997, the District Court ordered the Service to finalize critical habitat for the flycatcher by July 18, 1997. As ordered, the critical habitat was published on July 18, 1997, and became effective on August 21, 1997. A correction notice was published in the Federal Register on August 20, 1997.

Life History

The southwestern willow flycatcher forages within and above dense riparian vegetation, taking insects on the wing or gleaning them from foliage (Wheelock 1912, Bent 1963). No information is available on specific prey species. However, fecal samples containing identifiable invertebrate body parts were collected during banding operations from more than 70 southwestern willow flycatchers in California, Arizona, and southwestern Colorado (M. Sogge, pers. comm.). These samples could yield important data on prey use at various locations and timing throughout the breeding season.

The southwestern willow flycatcher begins arriving on breeding grounds in late April and May (Sogge and Tibbitts 1992, Sogge *et al.* 1993, Sogge and Tibbitts 1994, Muiznieks *et al.* 1994, Maynard 1995, Sferra *et al.* 1995). Migration routes are not completely known. However, willow flycatchers have been documented migrating through specific locations and drainages in Arizona that do not currently support breeding populations, including the upper San Pedro River (BLM, unpubl. data), Colorado River through Grand Canyon National Park

(Sogge and Tibbitts 1992, Sogge *et al.* 1993, Sogge and Tibbitts 1994), lower Colorado River (Muiznieks *et al.* 1994, Spencer *et al.* 1996), Verde River tributaries (Muiznieks *et al.* 1994), and Cienega Creek (BLM, *in litt.*). These observations probably include subspecies *E.t. adastus*. *Empidonax* flycatchers rarely sing during fall migration, so that a means of distinguishing some migrating *Empidonax* without a specimen is not feasible (Blake 1953, Peterson and Chalif 1973). However, willow flycatchers have been reported to sing and defend winter territories in Mexico and Central America (Gorski 1969, McCabe 1991).

Nesting begins in late May and early June and young fledge from late June through mid-August (Willard 1912, Ligon 1961, Brown 1988a,b, Whitfield 1990, Sogge and Tibbitts 1992, Sogge *et al.* 1993, Muiznieks *et al.* 1994, Whitfield 1994, Maynard 1995).

Southwestern willow flycatchers typically lay three to four eggs in a clutch (range = 2-5). The breeding cycle, from laying of the first egg to fledging, is approximately 28 days. Eggs are laid at one-day intervals (Bent 1963, Walkinshaw 1966, McCabe 1991); they are incubated by the female for approximately 12 days; and young fledge approximately 12 to 13 days after hatching (King 1955, Harrison 1979). Southwestern willow flycatchers typically raise one brood per year but have been documented raising two broods during one season (Whitfield 1990). They have also been documented reneesting after nest failure (Whitfield 1990, Sogge and Tibbitts 1992, Sogge *et al.* 1993, Sogge and Tibbitts 1994, Muiznieks *et al.* 1994, Whitfield 1994, Whitfield and Strong 1995).

Whitfield, who has accumulated the largest data set on southwestern willow flycatchers, reported the following data on survivorship of adults and young: of 58 nestlings banded since 1993, 21 (36%) returned to breed; of 57 birds banded as adults (after hatch year) since 1989, 18 (31%) returned to breed at least 1 year (10 males, 8 females); 5 (9%) returned to breed for 2 years (all males); and 2 (3.5%) returned to breed for 3 years (M. Whitfield, Kern River Preserve, pers. comm.). Whitfield (1995) also documented statistically significant variation in return rates of juveniles as a function of fledging date; approximately 21.9% of juveniles fledged on or before July 20th returned to her study area the following year, whereas only 6.4% of juveniles fledged after July 20th returned the following year.

Walkinshaw (1966), who studied *E.t. traillii* in Michigan, estimated that 40.9% of the males at his study site returned to breed for at least 2 years, 22.7% returned for at least 3 years, 13.6% returned for at least 4 years, and at least 4.5% returned during their year 5. Female return rates were substantially lower. Only 22.6% returned to breed for 1 year. Whitfield and Walkinshaw do not incorporate potential emigration rates into their estimates of returns and, thus, may underestimate actual survivorship. However, these data are consistent with survival rates for other passerines (Gill 1990, chap. 21) suggesting that the mean willow flycatchers is probably 2 to 3 years (i.e. most flycatchers survive to breed 1 or 2 seasons).

Brood parasitism of southwestern willow flycatcher nests by the brown-headed cowbird (*Molothrus ater*) has been documented throughout the flycatcher's range (Brown 1988a,b, Whitfield 1990, Muiznieks *et al.* 1994, Whitfield 1994, Hull and Parker 1995, Maynard 1995, Sferra *et al.* 1995, Sogge 1995b). Cowbirds lay their eggs in the nests of other

species directly affecting their hosts by reducing nest success. Cowbird parasitism reduces host nest success in several ways. Cowbirds may remove some of the host's eggs, reducing overall fecundity. Hosts may abandon parasitized nests and attempt to renest, which can result in reduced clutch sizes, delayed fledging, and reduced overall nesting success and fledgling survivorship (Whitfield 1994, Whitfield and Strong 1995). Cowbird eggs, which require a shorter incubation period than those of many passerine hosts, hatch earlier giving cowbird nestlings a competitive advantage over the host's young for parental care (Bent 1963, McGeen 1972, Mayfield 1977a,b, Brittingham and Temple 1983). Where studied, high rates of cowbird parasitism have coincided with southwestern willow flycatcher population declines (Whitfield 1994, Sogge 1995a, Sogge 1995c, Whitfield and Strong 1995), or, at a minimum, resulted in reduced or complete elimination of nesting success (Muiznieks *et al.* 1994, Whitfield 1994, Maynard 1995, Sferra *et al.* 1995, Sogge 1995a, Sogge 1995c, Whitfield and Strong 1995). Whitfield and Strong (1995) found that flycatcher nestlings fledged after July 20th had a significantly lower return rate and that cowbird parasitism was often the cause of delayed fledging.

Habitat Use

The southwestern willow flycatcher breeds in dense riparian habitats from sea level in California to over 7000 feet in Arizona and southwestern Colorado. Throughout its wide geographic and elevational range, its riparian habitat can be broadly described based on plant species composition and habitat structure (Sogge *et al.* 1997). These attributes are among the most conspicuous components of flycatcher habitat but not necessarily the only important components. They are easily identified from photographs or during field visits and have been useful in conceptualizing, selecting, and evaluating suitable survey habitat. Photographs and accompanying text provided in Sogge *et al.* (1997) characterize the considerable variation in habitat structure and plant species composition found at breeding sites throughout the southwestern willow flycatcher's range. Two components that vary less across this subspecies' range are vegetation density and the presence of surface water. Those and other characteristics, such as size and shape of habitat patches, are described further below.

Based on the diversity of plant species composition and complexity of habitat structure, four basic habitat types can be described for the southwestern willow flycatcher. Those types are described below and should be referenced with photographs provided in Sogge *et al.* (1997). When reviewing the habitat descriptions below and applying them to a particular location in the field, keep in mind that characteristics of actual breeding sites fall somewhere on a continuum from monotypic to multiple plant species, and from a relatively simple habitat structure characterized by a single vegetation stratum to more complex habitat patches characterized by multiple-strata.

Monotypic willow: Nearly monotypic, dense stands of willow (often *S. exigua* or *S. geyeriana*) 3 to 7 meters in height with no distinct overstory layer; usually very dense structure in at least lower 2 m; live foliage density is high from the ground to canopy.

Monotypic exotic: Nearly monotypic, dense stands of exotics such as saltcedar (*Tamarisk* sp.) or Russian olive (*Elaeagnus angustifolia*) 4 to 10 m in height forming a nearly continuous, closed canopy (with no distinct canopy layer); lower 2 m may be very difficult to penetrate due to branch density; however live foliage volume may be relatively low from 1 to 2 m above ground; canopy density uniformly high.

Native broadleaf dominated: Comprised of dense stands of single species (often Goodding's or other willows) or mixtures of native broadleaf trees and shrubs including, but not limited to, cottonwood, willows, boxelder, ash, buttonbush, and stinging nettle from 4 to 15 m in height; characterized by trees of different size classes; may have distinct overstory of cottonwood, willow or other broadleaf species, with recognizable subcanopy layers and a dense understory of mixed species; exotic/introduced species may be a rare component, particularly in understory.

Mixed native/exotic: Dense mixtures of native broadleaf trees and shrubs (such as those listed above) mixed with exotic species such as tamarisk and Russian olive; exotics are often primarily in the understory, but may also be a component of overstory; the native and exotic components may be dispersed throughout the habitat or concentrated as a distinct patch within a larger matrix of habitat; overall, a particular site may be dominated primarily by natives, exotics, or be a more or less equal mixture.

There are other potentially important dimensions or characteristics of southwestern willow flycatcher habitat, including: size, shape, and distribution of vegetation patches; hydrology; prey types and abundance; parasites; predators; environmental factors (e.g. temperature, humidity); and interspecific competition. Underlying these are factors relating to population dynamics, such as demography (i.e. birth and death rates, age-specific fecundity), the distribution of breeding groups across the landscape, flycatcher dispersal patterns, migration routes, site fidelity, philopatry, and degree of conspecific sociality (e.g. coloniality). Most of these attributes are not well understood for the southwestern willow flycatcher. However, some of these factors may be critical to understanding current population dynamics and habitat use. For example, characterizations of suitable breeding habitat may be significantly biased if observed patterns of habitat use are influenced by intrinsic dispersal patterns and capabilities rather than overall habitat quality.

Ultimately, habitat suitability should be measured in terms of reproductive success and survivorship that result in a positive rate of population growth. Without long term data that correlate or experimentally verify which combination of the above attributes contribute to population growth, habitat descriptions should be viewed broadly and considered descriptors of "suitable survey habitat."

The size and shape of occupied riparian habitat patches vary considerably. Southwestern willow flycatchers have been found nesting in patches as small as 0.8 hectares (e.g. Grand Canyon) and as large as several hundred hectares (e.g. Roosevelt Lake, Lake Mead). When viewed from above, the mixed vegetation types in particular often appear as a mosaic of

plant species and patch shapes and sizes. In contrast, narrow, linear riparian habitats one or two trees wide do not appear to contain attributes attractive to nesting flycatchers. However, flycatchers have been found using these habitats during migration.

Open water, cienegas, marshy seeps, or saturated soil are typically in the vicinity of flycatcher territories and nests; flycatchers sometimes nest in areas where nesting substrates were in standing water (Maynard 1995, Sferra *et al.* 1995, 1997). However, hydrological conditions at a particular site can vary remarkably in the arid Southwest within a season and between years. At some locations, particularly during drier years, water or saturated soil is only present early in the breeding season (i.e. May and part of June). However, the total absence of water or visibly saturated soil has been documented at several sites where the river channel has been modified (e.g. creation of pilot channels), where modification of subsurface flows has occurred (e.g. agricultural runoff), or as a result of changes in river channel configuration after flood events (Spencer *et al.* 1996).

Nest placement and nesting substrate

Southwestern willow flycatcher nests are open cup structures, approximately 8 centimeters high and 8 centimeters wide (outside dimensions), exclusive of any dangling material at the bottom. Nests are typically placed in the fork of a branch with the nest cup supported by several small-diameter vertical stems. The main branch from which the fork originates may be oriented vertically, horizontally, or at an angle, and stem diameter for the main supporting branch can be as small as three to four cm. Vertical stems supporting the nest cup are typically one to two cm in diameter. Occasionally, southwestern willow flycatchers place their nests at the juncture of stems from separate plants, sometimes different plant species. Those nests are also characterized by vertically-oriented stems supporting the nest cup. Spencer *et al.* (1996) measured the distance between flycatcher nests and shrub/tree center for 38 nests in monotypic saltcedar and mixed native broadleaf/saltcedar habitats. In monotypic saltcedar stands ($n=31$), nest placement varied from 0.0 m (center stem of shrub or tree) to 2.5 m. In the mixed riparian habitat ($n=7$), nest placement varied from 0.0 to 3.3 m.

Nest height relative to the base of nest substrate also varies across the southwestern willow flycatcher's range and may be correlated with height of nest substrate and/or overall canopy height. Table 1 presents data on nest heights in different riparian habitat types across the flycatcher's range. Southwestern willow flycatcher nests have been found as low as 0.6 m above the ground to 14 m above the ground. The data presented in Table 1 demonstrate that flycatchers using predominantly native broadleaf riparian habitats nest relatively low to the ground (between 1.8 m and 2.1 m on average), whereas those using mixed native/exotic and monotypic exotic riparian habitats nest relatively high above the ground (between 4.3 m and 7.4 m on average).

Historic egg/nest collections and species' descriptions from throughout the southwestern willow flycatcher's range confirm the bird's widespread use of willow for nesting (Phillips

Table 1. Nest height and nest substrate height data by riparian habitat type for the southwestern willow flycatcher.

Habitat Type	n	Mean Nest Ht. Relative to Substrate [m] ± 1 STD (range)	Mean Nest Height [m] ± 1 STD (range)	Base of Nest Substrate Source
Monotypic stands of Geyer willow (Apache Co., AZ)	33	1.8 ±0.3 (1.0 - 2.3)	4.4 ±0.5 (3.5 - 6.0)	Muiznieks <i>et al.</i> (1994), Sferra <i>et al.</i> (1995) Spencer <i>et al.</i> (1996)
Mixed native broadleaf, predominantly Goodding's willow (Yuma Co., AZ)	28	2.1 ±0.8 (1.2 - 4.9)	-	H. Brown 1902 collections (T. Huels <i>in litt.</i>)
Mixed native broadleaf (Kern Co., CA)	134	2.1 ±0.1 (0.6 - 10)	5.6 ±0.3 (1 - 14)	Whitfield and Strong (1995)
Mixed native broadleaf/saltcedar (throughout AZ)	70	4.8 ±1.8 (1.5 - 10.5)	7.4 ±2.3 (3.5 - 17.0)	Muiznieks <i>et al.</i> (1994), Sferra <i>et al.</i> (1995) Spencer <i>et al.</i> (1996, 1997)
Mixed native broadleaf/exotic (Grant Co., NM)	45	7.4 ±3.6 (2.0 - 14)	12.7 ±5.2 (4 - 28)	Skaggs (1995)
Monotypic saltcedar (throughout AZ)	43	4.3 ±1.3 (2.7 - 8.0)	7.7 ±2.0 (3.4 - 12.0)	Muiznieks <i>et al.</i> (1994), Sferra <i>et al.</i> (1995) Spencer <i>et al.</i> (1996, 1997)

1948, Phillips *et al.* 1964, Hubbard 1987, Unitt 1987, T. Huels *in litt.* 1993, San Diego Natural History Museum 1995). Of the 34 nests found by Brown in 1902 near Yuma on the lower Colorado and Gila rivers, 33 were in Goodding's willow and one was in arrowweed. Data from historic egg collections from southern California and more current studies indicate that 75 to 80% of nests were placed in willows (San Diego Natural History Museum 1995).

Currently, southwestern willow flycatchers use a wide variety of plant species for nesting substrates. At the monotypic willow stands that characterize high elevation sites in Arizona, Geyer willow was used almost exclusively for nesting (Muiznieks *et al.* 1994). At the inflow to Lake Mead on the Colorado River, Goodding's willow was the primary nesting substrate (R. McKernan unpubl. data). Along a 20-mile stretch of the Gila River in Grant County, New Mexico, where boxelder is the dominant understory species, 76% of flycatcher nests were placed in boxelder, with the remainder in Russian olive and saltcedar (Skaggs 1996). At the inflows of Tonto Creek and Salt River to Roosevelt Lake in Gila County, Arizona, both of which are comprised of monotypic stands of saltcedar, 100% of flycatcher nests were placed in saltcedar (Muiznieks *et al.* 1994, Sferra *et al.* 1995, Spencer *et al.* 1996). On the San Luis Rey River in San Diego County, California, approximately 90% of flycatcher nests were placed in live oak (*Quercus agrifolia*), which became the dominant plant species adjacent to the stream after willows were removed in the 1950s as a water conservation measure and a reservoir upstream reduced flood frequency and streamflow volume (W. Haas, San Diego Natural History Museum, pers. comm., 1995). Other plant species that southwestern willow flycatcher nests have been documented in include: buttonbush, black twinberry (*Lonicera involucreata*), Fremont cottonwood, white alder (*Alnus rhombifolia*), blackberry (*Rubus ursinus*), Russian olive, and *S. hindsiana*.

Territory size

Southwestern willow flycatcher territory size, as defined by song locations of territorial birds, probably changes with population density, habitat quality, and nesting stage. Early in the season, territorial flycatchers may move several hundred meters between singing locations (Sogge *et al.* 1995, Petterson and Sogge 1996). It is not known whether these movements represent polyterritorial behavior or active defense of the entire area encompassed by singing locations. However, during incubation and nestling phases territory size, or at least the activity centers of pairs, can be very small and restricted to an area less than 0.5 hectare. Sogge *et al.* (1995) estimated a breeding territory size of 0.2 hectares for a pair of flycatchers occupying a 0.6-hectare patch on the Colorado River. Activity centers may expand after young are fledged but while still dependent on adults.

Distribution and abundance

Unitt (1987) noted that taxonomic confusion between *E. trailli* and *E. alnorum* (alder flycatcher) and among other *Empidonax* species that migrate through the southwestern U.S. probably accounted for the relative lack of research on the southwestern willow flycatcher. The alder and willow flycatchers, formerly known as Traill's flycatcher, were not officially

recognized as separate species until the American Ornithologist's Union published its sixth edition Checklist of North American Birds (American Ornithological Union 1983). The lack of systematic, rangewide collections of southwestern willow flycatchers preclude a complete description of this subspecies' former distribution and abundance. However, the more than 600 egg, nest, and specimen records available from museums throughout the U.S. in combination with state, county, and local faunal accounts from the first half of the 20th Century do indicate that, historically, the southwestern willow flycatcher was more widespread and, at least, locally abundant.

Phillips (1948) first described *E.t. extimus* from a specimen collected by Gale Monson on the lower San Pedro River near Feldman, Arizona. The taxonomic validity of *E.t. extimus* was subsequently reviewed by Hubbard (1987), Unitt (1987), and Browning (1993), and has been accepted by most authors (e.g., Aldrich 1951, Behle and Higgins 1959, Phillips *et al.* 1964, Oberholser 1974, Monson and Phillips 1981, Harris *et al.* 1987a,b, Schlorff 1990a,b, Harris 1991). Unitt (1987) reviewed historical and contemporary records of *E.t. extimus* throughout its range, determining that it had "declined precipitously..." and that although the data reveal no trend in the past few years, the population is clearly much smaller now than 50 years ago, and no change in the factors responsible for the decline seem likely.

Overall, Unitt (1987) documented the loss of more than 70 breeding locations rangewide, including locations along the periphery and within core drainages that form this subspecies' range. Unitt estimated that, rangewide, the southwestern willow flycatcher population probably was comprised of 500 to 1000 pairs. Below is a state-by-state comparison of historic and current data for the southwestern willow flycatcher. Since 1992 more than 800 historic and new locations have been surveyed rangewide to document the status of the southwestern willow flycatcher (some sites in southern California have been surveyed since the late 1980s). Survey efforts in most states were done under the auspices of the Partners In Flight program, which served as the coordinating body for survey training sessions and review and synthesis of data. The extensive and, in some cases, intensive nature of these efforts have provided a critical baseline for the current distribution, abundance, and reproductive success of southwestern willow flycatchers rangewide.

California

The historic range of southwestern willow flycatchers in California apparently included all lowland riparian areas in the southern third of the state. It was considered a common breeder where suitable habitat existed (Wheelock 1912, Willett 1912, 1933, Grinnell and Miller 1944). Unitt (1984, 1987) concluded that it was once common in the Los Angeles basin, the San Bernardino/Riverside area, and San Diego County. Specimen and egg/nest collections confirm its former distribution in all coastal counties from San Diego Co. to San Luis Obispo Co., as well as in the inland counties, Kern, Inyo, Mohave, San Bernardino, and Imperial. Unitt (1987) documented that the flycatcher had been extirpated, or virtually extirpated (i.e., few territories remaining) from the Santa Clara River (Ventura Co.), Los Angeles River (Los Angeles Co.), Santa Ana River (Orange and Riverside counties), San Diego River (San Diego

Co.), lower Colorado River (Imperial and Riverside counties and adjacent counties in Arizona), Owen's River (Inyo Co.), and the Mohave River (San Bernardino Co.). Its former abundance in California is evident from the 72 egg and nest sets collected in Los Angeles County, alone, between 1890 and 1912, and from Herbert Brown's 34 nests and 9 specimens taken in June, 1902 from the lower Colorado river near Yuma. Local collections of this magnitude suggest that this subspecies was locally very abundant.

Survey and monitoring efforts since the late 1980s have confirmed the southwestern willow flycatcher's presence at 18 locations on 11 drainages in southern California (including Colorado River). Current known flycatcher breeding sites are restricted to 3 counties, San Diego, Riverside, Santa Barbara, and Kern. Combining survey data for all sites surveyed since the late 1980s for a composite population estimate, the total known southwestern willow flycatcher population in southern California is 114 territories (Table 2). Of the 18 sites where flycatchers have been documented, 72% (13) contain 5 or fewer territorial flycatchers; 22% (4 sites) have single pairs, or unmated territorial birds. Only 3 drainages are known to have 20 or more flycatcher territories, the San Luis Rey River (San Diego Co.), South Fork Kern River (Kern Co.), and Santa Ynez River (Santa Barbara Co.).

Authorized (permitted) and unauthorized activities in riparian habitats continue to adversely affect occupied flycatcher habitat in southern California. For example, approximately one kilometer of occupied habitat on the Santa Ynez River in Santa Barbara County was modified or completely eliminated in 1996 when expansion of agricultural fields resulted in clearing of riparian vegetation (USFWS *in litt.*). Despite the vast potential for riparian habitat and southwestern willow flycatcher recovery on Camp Pendleton in San Diego County, a programmatic section 7 consultation resulted in a conservation target of 20 southwestern willow flycatcher pairs (Table 3). The Base currently has approximately 22 pairs of flycatchers, in contrast to the 348 pairs of the sympatric and endangered least Bell's vireo (*Vireo bellii pusillus*), which through the Base's conservation efforts increased from a low of 27 pairs in 1984. Army Corps of Engineers operations of Lake Isabella (Kern County) will result in long-term inundation of the 485-ha South Fork Wildlife Area, also proposed critical habitat for the flycatcher. The Wildlife Area represents a significant recovery area occupied by 8 to 10 pairs of flycatchers prior to inundation and lies downstream of one of California's largest southwestern willow flycatcher breeding groups on the Kern River Preserve.

Arizona

Historic records for Arizona indicate the former range of the southwestern willow flycatcher included portions of all major river systems (Colorado, Salt, Verde, Gila, Santa Cruz, and San Pedro) and major tributaries, such as the Little Colorado River and headwaters, and White River.

Unitt (1987) noted that "probably the steepest decline in the population levels of *extimus* has occurred in Arizona." The bird has been extirpated, or virtually extirpated from the Santa

Table 2. Rangelwide population status for the southwestern willow flycatcher (based on composite of 1993-1995 survey data and 1996 survey data from lower Colorado River)¹.

<u>No. of Sites (Drainages)</u>						
	No. of Sites with Territories	No. of Drainages with Territories	No. of Sites (Drainages)			No. of Territories
			with ≤5 Territories	with 6-20 Territories	with >20 Territories	
New Mexico	19	8	16 (6)	2 (0)	1 (2)	173
Arizona	39	9	29 (4)	10 (4)	0 (2)	150
California	18	11	13 (8)	3 (1)	2 (3)	114
Colorado	6	5	6 (5)	0 (0)	0 (0)	13
Utah	2	1	2 (1)	0 (0)	0 (0)	2
Nevada	1	1	1 (1)	0 (0)	0 (0)	2
Texas	?	?	?	?	?	?
Total	85	35	67 (24)	15 (4)	3 (7)	454

¹ Based on surveys conducted at >800 historic and new sites in NM (Maynard 1995, Cooper 1996, Skaggs 1996); AZ (Sogge and Tibbitts 1992, Sogge *et al.* 1993, Muiznieks *et al.* 1994, Sogge and Tibbitts 1994, Sferri *et al.* 1995, Sogge 1995a, Sogge *et al.* 1995, Spencer *et al.* 1996, 1997, McKernan *in litt.*); CA (Camp Pendleton 1994, Whitfield 1994, Griffith and Griffith 1995, Holmgren and Collins 1995, Kus 1995, San Diego Natural History Museum 1995, Whitfield and Strong 1995, Griffith and Griffith 1996 *in litt.*); CO (T. Ireland 1994 *in litt.*, Sransky 1995); UT (McDonald *et al.* 1995, Sogge 1995b); NV (C. Tomlinson 1995 *in litt.*). Systematic surveys have not been conducted in Texas. For sites surveyed multiple years, highest single-year estimate of territories was used to tabulate status data. Tabulations do not include documented extirpations within survey period. Thus, individual state estimates and rangelwide totals may be biased upward.

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Table 3. Agency actions that have undergone section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide.

Action	Year	Federal Agency ¹	Incidental Take Anticipated
Arizona			
Eastern Roosevelt Lake Watershed Allotment (Maricopa Co.)	1995*	Tonto NF	Indeterminable
Tonto Creek Riparian Unit (Maricopa Co.)	1995*	Tonto NF	Indeterminable
Cedar Bench Allotment (Yavapai Co.)	1995	Tonto NF	Indeterminable
Tuzigoot Bridge (Yavapai Co.)	1995*	NPS	None
Verde Valley Ranch (Yavapai Co.)	1995*	Corps	Loss of 2 flycatcher territories
Windmill Allotment (Yavapai Co.)	1995	Coconino NF	Loss of 1 flycatcher nest annually
Romero Road Bridge (Pinal Co.)	1995*	FEMA	Consultation in process
Glen Canyon Spike Flow (Coconino Co.)	1996	USBR	Adverse modification of proposed critical habitat
Solomon Bridge (Graham Co.)	1996*	FHWA	Loss of 2 territories
Modified Roosevelt Dam (Gila/Maricopa Co.)	1996*	USBR	Loss of 45 territories; reduced productivity/survivorship 90 birds
U.S. Hwy 93 Wickenburg (Mohave Co.)	1996*	FHWA	Reduced productivity of 3 territories annually for 2 years
Grazing on 13 Allotments (Pinal Co.)	1996	BLM	Consultation in process
Lower Gila Resource Plan Amend. (Yuma Co.)	1996	BLM	Consultation in process
Lower Colorado River Operations	1996*	USBR	Consultation in process
U.S. Forest Service Region 3 Forest Plans	1996	USFS	Consultation in process
Safford District Grazing Allotments	1996	BLM	Consultation in process
Virgin River Diversion/Fill (Mohave Co.)	1997	EPA	None
California			
Prado Basin, (Riverside/San Bernardino Co.)	1994	Corps	None
Orange County Water District (Orange Co.)	1995	Corps	None
Temescal Wash Bridge (Riverside Co.)	1995	Corps	Harm to 2 flycatchers
Camp Pendleton (San Diego Co.)	1995	DOD	Loss of 4 flycatcher territories
Lake Isabella Operations 1996 (Kern Co.)	1996*	Corps	Inundation 700 ac proposed critical habitat; reduced productivity 14 pairs
Lake Isabella Long-Term Operations (Kern Co.)	1997*	Corps	Consultation in process

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Table 3 (continued).

Action	Year	Federal Agency ¹	Incidental Take Anticipated
Nevada			
Gold Properties Resort (Clark Co.)	1995	BIA	Harm to 1 flycatcher from habitat loss
New Mexico			
Corrales Unit, Rio Grande (Bernalillo Co.)	1995	Corps	None
Rio Puerco Resource Area	1996	BLM	Consultation in process
Farmington District Resource Management Plan	1996*	BLM	Consultation in process
Mimbres Resource Area Management Plan	1996*	BLM	Consultation in process

¹ BIA = Bureau of Indian Affairs; BLM = Bureau of Land Management; Corps = Army Corps of Engineers; DOD = Dept. of Defense; EPA = Environmental Protection Agency; FEMA = Federal Emergency Management Agency; FHWA = Federal Highway Administration; NF = National Forest; NPS = National Park Service; USBR = U.S. Bureau of Reclamation; USFS = U.S. Forest Service.

* Original proposed action determined to result in jeopardy to the flycatcher and/or adverse modification of proposed critical habitat.

Cruz River (Pima Co.), upper San Pedro River (Cochise Co.), lower San Pedro River at PZ Ranch (Pinal Co.), Blue River (Greenlee Co.), Colorado River at Lees Ferry (Coconino Co.), Colorado River (Yuma Co.), Gila River (Yuma Co.), and Verde River at Tuzigoot Bridge (Yavapai Co.). Currently, 150 territories are known from 39 sites along 9 drainages statewide, including the Colorado River (Table 2). As in California, the majority of breeding groups in Arizona are extremely small; of the 39 sites where flycatchers have been documented, 74% (29) contain 5 or fewer territorial flycatchers. Moreover, 15% to 18% of all sites in Arizona are comprised of single, unmated territorial birds.

Permitted activities and stochastic events also continue to adversely affect the distribution and extent of occupied and potential breeding habitat throughout Arizona. For example, the Bureau of Reclamation is operating the new conservation space at Roosevelt Lake, which at capacity would totally inundate the riparian stands occupied by Arizona's largest breeding group (Table 3). As a result of Reclamation's operations on the lower Colorado River, the 445-ha Goodding's willow stand at the inflow to Lake Mead has been partially inundated since September 1995. Despite partial inundation, approximately eight pairs of flycatchers were documented nesting at the inflow during the 1996 breeding season. As of April 1997, inundation of that habitat was nearly complete. The Bureau of Reclamation projected the mortality of that stand sometime during 1997 as a result of prolonged inundation of root crowns (i.e. > two growing seasons).

In June of 1996, a catastrophic fire destroyed approximately one km of occupied habitat on the San Pedro River in Pinal County. That fire resulted in the forced dispersal or loss of up to 8 pairs of flycatchers (Paxton *et al.* 1996). In June, 1995, approximately three miles of occupied riparian habitat burned on the Gila River in Pinal County (Bureau of Land Management *in litt.*). It is not known how many flycatchers occupied that location. Approximately two km of riparian habitat burned in Graham County in the vicinity of Safford during 1996. It is not known whether that area was occupied by southwestern willow flycatchers, however, it did lie just downstream of an occupied patch that was partially eliminated by Solomon Bridge (Table 3). The anticipated effect of construction of the Solomon Bridge was dispersal of flycatchers into adjacent habitat. The capability of adjacent habitat to absorb that dispersal was compromised by the fire near Safford.

New Mexico

Unitt (1987) considered New Mexico as the state with the greatest number of *extimus* remaining. After reviewing the historic status of the flycatcher and its riparian habitat in New Mexico, Hubbard (1987) concluded,

[it] is virtually inescapable that a decrease has occurred in the population of breeding willow flycatchers in New Mexico over historic time. This is based on the fact that wooded sloughs and similar habitats have been widely eliminated along streams in New Mexico, largely as a result of the activities of man in the area.

Unitt (1987), Hubbard (1987), and more recent survey efforts have documented extirpation or virtual extirpation in New Mexico on the San Juan River (San Juan Co.), near Zuni (McKinley Co.), Blue Water Creek (Cibola Co.), Rio Grande (Dona Ana Co. and Socorro Co.). Survey and monitoring efforts since 1993 have documented 173 flycatcher territories on eight drainages (Table 2). Approximately 135 of these territories occur in remnant strips of riparian forest within a 20-mile stretch of the Gila River in Grant Co (Skaggs 1995). This area contains the largest known breeding group rangewide. In a letter responding to proposed critical habitat for the flycatcher, this part of the Gila River is characterized as being contained by flood-control levees that do not support the regeneration of riparian trees such as willow and cottonwood. Thus, under existing conditions, habitat suitable for the southwestern willow flycatcher is not regenerating and this largest population may be lost as a result. Outside of Grant County few flycatchers remain. Statewide, 84% (16) of the 19 sites with flycatchers contain 5 or fewer territorial birds. Six sites are comprised of single pairs or unmated territorial flycatchers, and six others are comprised of two pairs or two unmated territorial birds.

Texas

The Pecos and Rio Grande rivers in western Texas are considered the easternmost boundary for the southwestern willow flycatcher. Unitt (1987) found specimens from four locations in Brewster, Hudspeth, and Loving counties where the subspecies is no longer believed to be present. Landowner permission to survey riparian areas on private property has not been obtained, thus current, systematic survey data is not available for Texas. There have been no other recent reports, anecdotal or incidental, of southwestern willow flycatcher breeding attempts in the portion of western Texas where they occurred historically. Given that surveys in adjacent Dona Ana County, New Mexico, have failed to document breeding along historically-occupied portions of the Rio Grande, the Service believes it is likely that the southwestern willow flycatcher has been extirpated from Texas.

Colorado

The taxonomic status and the historic distribution and abundance of willow flycatchers in southwestern Colorado remains unclear due to a lack of specimen data and breeding records. Preliminary data on song dialects suggests that the few birds recently documented in southwestern Colorado may be *E.t. extimus*. These sightings have prompted State and Federal agencies to delineate provisional boundaries for southwestern willow flycatchers and sponsor statewide survey efforts. Survey efforts since 1993 have documented a total of six locations in Delta, Mesa, and San Miguel counties where southwestern willow flycatchers have been found (Table 2). Two locations have single, unmated males; two locations have single pairs, and the remaining two locations are comprised of four to seven territories each.

On March 9, 1997, a fire started by an adjacent landowner burned a 32-hectare portion of the Escalante Wildlife near Delta, Colorado. That location comprised one of the largest known

breeding sites for southwestern willow flycatchers in Colorado with approximately seven pairs occupying the site in 1996.

Utah

Specimen data reveal that southwestern willow flycatcher historically occurred in southern Utah along the Colorado River, San Juan River, Kanab Creek, Virgin River, and Santa Clara River (Unitt 1987). Their northern boundary in south-central Utah remains unclear due to a lack of specimen data from that region. The southwestern willow flycatcher no longer occurs along the Colorado River in Glen Canyon where Lake Powell inundated historically-occupied habitat, nor in unflooded portions of Glen Canyon near Lee's Ferry where southwestern willow flycatchers were documented nesting in 1938. Similarly, recent surveys on the Virgin River and tributaries and Kanab Creek have failed to document their presence (McDonald *et al.* 1995). Single, territorial males and possibly a pair of southwestern willow flycatchers were documented at two locations on the San Juan River (San Juan Co.) in 1995, but breeding was not confirmed (Sogge 1995b). The population totals for Utah are summarized in Table 2.

Nevada

Unitt (1987) documented 3 locations in Clark County from which southwestern willow flycatchers had been collected, but not found after 1970. Current survey efforts have documented a single location with 2 unmated males on the Virgin River in Clark County (Tomlinson *in litt.*; Table 2).

Rangewide, the current known population of southwestern willow flycatchers stands at approximately 454 territories (Table 2). These results indicate a critical population status; more than 75% of the locations where flycatchers have been found are comprised of 5 or fewer territorial birds and up to 20% of the locations are comprised of single, unmated individuals. The distribution of breeding groups is highly fragmented, with groups often separated by considerable distances (e.g., approximately 88 kilometer straight-line distance between breeding flycatchers at Roosevelt Lake, Gila Co., Arizona, and the next closest breeding groups known on either the San Pedro River (Pinal Co.) or Verde River (Yavapai Co.)). Additional survey effort, particularly in southern California, may discover additional small breeding groups. However, rangewide survey efforts have yielded positive results in less than 10% of surveyed locations. Moreover, survey results reveal a consistent pattern rangewide: the southwestern willow flycatcher population as a whole is comprised of extremely small, widely-separated breeding groups or unmated individuals.

The data presented in Table 2 represents a composite of surveys conducted since 1992. Locations that had southwestern willow flycatchers for only one year were tabulated as if the location is still extant. Given that extirpation has been documented at several locations during the survey period, this method of analyses introduces a bias that may overestimate the number of breeding groups and overall population size. In addition, females have been documented singing as frequently as males. Because the established survey method relies on singing birds

as the entity defining a territory (Tibbitts *et al.* 1994), double-counting may be another source of sampling error that biases population estimates upward. The figure of 454 southwestern willow flycatcher territories is an approximation based on considerable survey effort, both extensive and intensive. Given sampling errors that may bias population estimates positively or negatively (e.g., incomplete survey effort, double-counting males/females, composite tabulation methodology), natural population fluctuation, and random events, it is likely that the total population of southwestern willow flycatchers is fluctuating at between 300 and 500 territories with a substantial proportion of individuals remaining unmated. If all extant sites were fully protected, at such low population levels random demographic, environmental, and genetic events could lead to extirpation of breeding groups and eventually render this species extinct. The high proportion of unmated individuals documented during recent survey efforts suggests the southwestern willow flycatcher may already be subject to a combination of these factors (e.g., uneven sex ratios, low probability of finding mates in a highly fragmented landscape).

Southwestern willow flycatcher reproductive success

Intensive nest monitoring efforts in California, Arizona, and New Mexico have revealed that: (1) sites with both relatively large and small numbers of pairs have experienced extremely high rates of brood parasitism; (2) high levels of cowbird parasitism in combination with nest loss due to predation have resulted in low reproductive success and, in some cases, population declines; (3) at some sites, levels of cowbird parasitism remain high across years, while at others parasitism varies temporally with cowbirds absent in some years; (4) the probability of a southwestern willow flycatcher successfully fledging its own young from a nest that has been parasitized by cowbirds is low (i.e., <5%); (5) cowbird parasitism and/or nest loss due to predation often result in reduced fecundity in subsequent nesting attempts, delayed fledging, and reduced survivorship of late-fledged young, and; (6) nest loss due to predation appears more constant from year to year and across sites, generally in the range of 30 to 50%.

On the South Fork Kern River (Kern Co., CA), Whitfield (1993) documented a precipitous decline in the southwestern willow flycatcher breeding population from 1989 to 1993 (44 to 27 pairs). During that same period cowbird parasitism rates between 50 and 80 percent were also documented (Whitfield 1993; Table 4). A cowbird trapping program initiated in 1993 reduced cowbird parasitism rates to < 20%. Southwestern willow flycatcher population numbers appear to have stabilized at 32 to 34 pairs in 1993, 1994, and 1995 (Whitfield 1994, Whitfield and Strong 1995). Predation rates have remained relatively constant in the range of 33 to 47% (Table 4). Southwestern willow flycatcher nest success increased from 26% prior to cowbird trapping to 48% after trapping was implemented (Whitfield and Strong 1995). In addition, the number of young fledged also increased from 1.01 young/pair to 1.73 young/pair during the same period.

Whitfield and Strong (1995) found that, besides lowering nest success, fecundity, and the number of young produced, cowbird parasitism may also lower survivorship of southwestern willow flycatcher young fledged late in the season. Southwestern willow flycatchers that

abandon parasitized nests or renest after fledging cowbirds lay fewer eggs in subsequent clutches and, if successful, fledge young late in the season. Whitfield and Strong determined that cowbird parasitism delayed successful southwestern willow flycatcher nesting by at least 13 days and this delay resulted in significantly different return rates of juveniles. Only 6.4% of southwestern willow flycatcher young that came from late nests were recaptured in subsequent years, whereas 21.9% of young that came from early nests were recaptured. If these recapture rates mirror actual survivorship, then even though some parasitized southwestern willow flycatchers eventually fledge their own young, nest loss due to parasitism or depredation may have the more insidious effect of reducing overall juvenile survivorship. Despite the cowbird trapping program and increased reproductive success, Whitfield has not observed a population increase at her study area. Whitfield and Strong (1995) speculate that other factors in addition to cowbird parasitism, such as habitat loss and pesticide use on wintering grounds and/or stochastic events such as storms resulting in mortality, may be keeping population numbers low.

The number of unmated, territorial, and paired southwestern willow flycatchers detected on the Colorado River in the Grand Canyon has remained low since monitoring began in 1982. Brown (1994) reported that at least 50% of the southwestern willow flycatcher nests monitored in the Grand Canyon between 1982 and 1987 were parasitized by brown-headed cowbirds. Brown (1994) did not report data on productivity. Given that the probability of successfully fledging a single chick is low when a nest is parasitized and the high proportion of nests parasitized during Brown's study, it is likely that southwestern willow flycatcher productivity during that period was also low. In 1992, when comprehensive nest monitoring was initiated, two pairs were present, with only one establishing a nest. That nest successfully fledged three chicks (Sogge and Tibbitts 1992).

In 1993, one breeding pair, one male with two females, and six unpaired males were detected. Three nests were found, all of which were parasitized by brown-headed cowbirds (Table 4). No southwestern willow flycatchers were successfully reared in Grand Canyon in 1993 (Sogge *et al.* 1993). Four pairs and one unpaired male occupied Grand Canyon in 1994. Nine nests were attempted, at least four of which were parasitized by cowbirds. All nesting attempts eventually failed due to predation or abandonment (Sogge and Tibbitts 1994). In 1995, one breeding pair and three unpaired males were detected (Sogge *et al.* 1995). One nest was found with a single cowbird egg on May 23. On June 4, three southwestern willow flycatcher eggs were present, but the cowbird egg was missing. That nest successfully fledged one chick. In summary, since 1992, 10 known pairs of southwestern willow flycatchers have made 14 nesting attempts in the Grand Canyon, 2 of which successfully fledged a total of 4 chicks. This low rate of reproduction indicates that, even with the protections provided annually by the National Park Service (i.e., camping and other activities are prohibited at southwestern willow flycatcher breeding sites), this area is a population sink (Pulliam 1988) where reproduction is not adequate to replace adults and population persistence requires migration from other breeding areas.

Table 4. Nest predation and brood parasitism rates documented for the southwestern willow flycatcher across its range¹.

<u>Location</u>	<u>Pre-1993</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>
S. Fork Kern River (Kern Co., CA)				
% nests parasitized ²	50 - 80	38*	16*	19*
% nests depredated	33 - 42	37	47	34
San Luis Rey River (San Diego Co. CA)				
% nests parasitized	-	-*		0*
% nests depredated	-	-		28 5
Colorado River (Coconino Co., AZ)				
% nests parasitized	≥50	100	44	100
% nests depredated	-	30	78	0
Verde River (Yavapai Co., AZ)				
% nests parasitized	-	100	50	extirpated
% nests depredated	-	100	50	
Little Colorado River (Apache Co., AZ)				
% nests parasitized	-	-	22	0
% nests depredated	-	-	33	28
Rio Grande (Socorro Co., NM)				
% nests parasitized	-	-	20	66
% nests depredated	-	-	40	60
Gila River (Grant Co., NM)				
% nests parasitized	-	-	-	16 - 27
% nests depredated	-	-	-	45

¹ Sources: Sogge and Tibbitts (1992), Sogge *et al.* (1993), Brown (1994), Maynard 1995, Muiznieks *et al.* (1994), Sogge and Tibbitts (1994), Cooper (1996), Skaggs (1995), Sogge (1995a), Sogge *et al.* (1995), Spencer *et al.* (1996), Whitfield and Strong (1995).

² Proportion of nests containing at least one brown-headed cowbird egg.

* Brown-headed cowbird control program implemented.

On the Verde River in Yavapai Co., Arizona, Ohmart (pers. comm.) discovered four pairs of southwestern willow flycatchers in 1992 at Clarkdale. The breeding status and reproductive success of those birds was not determined. In 1993, two pairs were present and one nest was documented. The nest contained a single cowbird nestling and eventually failed (Muiznieks *et al.* 1994; Table 4). In 1994, two pairs and one unpaired male were present. Two nests were found, one of which successfully fledged two chicks, the other fledged a single cowbird (Sferra *et al.* 1995). Data from a more limited monitoring effort in 1995 indicate that two unpaired males occupied the Clarkdale site (Sogge 1995a). Surveys during the 1996 breeding season failed to detect any southwestern willow flycatchers at the Clarkdale site. However, one nesting pair was discovered at Tavasci Marsh approximately 2.4 km east of the Clarkdale site. Thus, although since its discovery the Clarkdale site has had only several pairs, cowbird parasitism and nest loss due to depredation resulted in poor reproductive success and may have been responsible for abandonment or extirpation at this site.

Elsewhere in Arizona, population loss or undetected dispersal of breeding groups has been documented since 1993. For example, surveys in 1993 estimated five territorial males at Dudleyville Crossing on the San Pedro River (Pinal Co.). However, surveys in 1994 and 1995 failed to detect any southwestern willow flycatchers at that location (Muiznieks *et al.* 1994, Sferra *et al.* 1995, Spencer *et al.* 1996). Southwestern willow flycatchers detected in 1993 at Soza Wash on the San Pedro River were not detected in follow-up surveys in 1995, and an individual observed at Ister Flat on the Verde River was not detected in follow-up surveys during 1994. It is not known whether these events represent mortality of southwestern willow flycatchers, changes in habitat quality, or simply a vagile tendency inherent to this species. At other locations on the San Pedro River in Pinal Co., such as Cook's Lake and PZ Ranch, southwestern willow flycatcher breeding group size has remained stable. However, in 1996 a catastrophic fire destroyed much of the breeding habitat at PZ Ranch resulting in nest loss, abandonment of that site and, perhaps, mortality of adults (Paxton *et al.* 1996).

On the Little Colorado River in Apache Co., Arizona, a cowbird parasitism rate of 22% was documented in 1994 (Table 4). In 1995 the parasitism rate was zero. Nest loss due to depredation, however, remained relatively constant (Table 4). On the Rio Grande in Socorro Co., New Mexico, parasitism rates increased from 20% in 1994 to 66% in 1995. In 1996, water was diverted above that breeding location and no southwestern willow flycatchers were present (D. Leal, pers. comm.). It is not known whether those birds dispersed elsewhere or if that breeding group was extirpated. Finally, on the Gila River in Grant Co., NM, Skaggs (1995) monitored 46 nests from a breeding group of approximately 135 pairs. From a subset of 25 nests whose contents were checked directly or inferred through observation, Skaggs estimated a cowbird parasitism rate of between 16 and 27% for 1995 (Table 4).

The data presented above and in Table 4 demonstrate that cowbird parasitism and nest depredation are affecting southwestern willow flycatchers throughout their range. Cowbirds have been documented at more than 90% of sites surveyed (Sogge and Tibbitts 1992, Sogge *et al.* 1993, Camp Pendleton 1994, Muiznieks *et al.* 1994, Sogge and Tibbitts 1994, T. Ireland

1994 *in litt.*, Whitfield 1994, C. Tomlinson 1995 *in litt.*, Griffith and Griffith 1995, Holmgren and Collins 1995, Kus 1995, Maynard 1995, McDonald *et al.* 1995, Sferra *et al.* 1995, Sogge 1995a, Sogge 1995b, Sogge *et al.* 1995, Cooper 1996, San Diego Natural History Museum 1995, Stransky 1995, Whitfield and Strong 1995, Griffith and Griffith 1996 *in litt.*, Skaggs 1995, Spencer *et al.* 1996). Thus, the potential for cowbirds to be a persistent and widespread threat remains high. Cowbird trapping has been demonstrated to be an effective management strategy for increasing reproductive success for the southwestern willow flycatcher as well as for other endangered Passerines (e.g., least Bell's vireo [*Vireo bellii pusillus*], black-capped vireo [*V. atricapillus*], golden-cheeked warbler [*Dendroica chrysoparia*]). It may also benefit juvenile survivorship by increasing the probability that parents fledge birds early in the season. Expansion of cowbird management programs has the potential to not only increase reproductive output and juvenile survivorship at source populations, but also to potentially convert small, sink populations into breeding groups that contribute to population growth and expansion.

Nest loss due to predation is common among small Passerines. The rates documented for southwestern willow flycatchers are also typical for small Passerines (i.e., rates < 50%). However, even at these "typical" levels nest loss due to predation is a significant factor contributing to low reproductive success. Nest predation presents a difficult management challenge because of the variety of taxa involved and the difficulty in developing an effective management plan for more than one taxon. Until specific predators on southwestern willow flycatcher nests are identified, measures to reduce potential predator populations should focus on reducing human activities that attract predators, such as camping, picnicking, etc. where pets are loose and refuse is concentrated.

ENVIRONMENTAL BASELINE

General Environmental Baseline

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation. Along the Gila River, past and present Federal, State, private, and other human activities that may affect the species include livestock grazing, agriculture, mining, water diversions, sand and gravel operations, road and bridge construction, and recreational activities within flycatcher habitat or areas that contain potential flycatcher habitat.

The Gila River basin comprises approximately 58,200 square miles of the southern half of Arizona and southwestern New Mexico (Lilburn and Associates 1984). Above San Carlos Reservoir, the river basin comprises approximately 12,000 square miles (Olmstead 1919).

In the Safford area, the valley widens considerably with the floodplain extending several miles on either side of the river in some locations.

Streamflow in the Gila River consists of winter discharge (November through April) and summer discharge (July through October; Burkham 1970). Winter discharge results from snowmelt, storms, and outflow of groundwater and is characterized by constant flows for periods of several days and gradual changes in volume (Lilburn and Associates 1984). Local, convective activity is the primary factor in summer discharge, which is characterized by high unit rates and high flow volumes discharged from small parts of the overall watershed.

No major facilities regulate flows upstream of the San Carlos Reservoir. However, there are many canals and diversions used primarily for agricultural irrigation, mining and municipal uses. When surface flow is inadequate to meet irrigation needs, groundwater sources are used. Groundwater is the primary water source for domestic and industrial uses (Lilburn and Associates 1984) in most developed areas.

The Gila River in the Safford Valley has undergone significant documented change over the last 100 years, and the major trends probably hold true for the action area of this proposed project. Increasing human activities and effects of livestock grazing have resulted in the lowering of groundwater levels, decreases in surface flows, changes to the river's floodplain and channel dynamics, and changes in the extent and composition of riparian vegetation. The river channel has changed from a narrow, deep meandering channel to one that is wide, shallow, and braided. Burkham (1972) reported that the average channel width in the 1880s was 150 to 300 feet. Olmstead (1919) reported that a United States township survey in Graham county showed width averaged 1,935 feet. More recently, Graf *et al.* (1983) noted that the channel in the Safford Valley appeared to be in transition from a braided to a meandering stream. Changes to channel morphology have been and continue to be a function of watershed conditions, flood events, clearing of lands within the floodplain for agricultural and other uses, direct modification of the stream channel, and the extent and stability of floodplain vegetation.

Increases in human population and agricultural activity have resulted in increased groundwater pumping and reduced surface flows in the Gila Valley during the last 60 years (Lilburn and Associates 1984). In the Safford Valley, groundwater use increased from 20,000 acre-feet/year in the last half of the 1930s to 116,000 acre-feet/year during the last half of the 1960s resulting in a lowering of the water table of up to 25 feet (Lilburn and Associates 1984). Surface water flows have also declined steadily since 1925 as a result of diversions for agriculture (Graf *et al.* 1983). These activities have restricted floodplain development and the maintenance of native riparian vegetation communities.

The areal extent of riparian habitat and species composition have changed substantially over the last 100 years. Flooding events, clearing for agricultural and other land uses, modifications to the floodplain for flood control, and the invasion of the exotic tamarisk have reduced the functional capacity of riparian habitats to dampen flood damage and provide

wildlife habitat. Between 1881 and 1905, the Gila River in the Safford Valley was a meandering stream lined by cottonwood, willow, and mesquite (Graf *et al.* 1983). Ground photos of the Gila River in the Safford Valley in the 1880s indicate the riverbottom was dominated by "fairly dense cover of cottonwoods and willows," with "undergrowth beneath these trees...very dense and...almost impenetrable in places" (Graf *et al.* 1983). Tamarisk was not present in the photos. Tamarisk was documented on the Gila River in the Phoenix area in the 1890s and was first observed in the Safford Valley sometime between 1910 and 1920 (Graf *et al.* 1983). Graf *et al.* (1983) noted that by 1930 tamarisk had become the dominant bottomland vegetation on the upper Gila River. Riparian vegetation reached its maximum areal extent during this century between 1944 and 1945 and has fluctuated considerably since that time within the dynamic of flooding events, agricultural clearing and phreatophyte control. One factor that has remained constant, however, is the predominance of tamarisk within existing riparian habitats.

Status of the species (in the action area)

Surveys for the southwestern willow flycatcher were conducted in the proposed action area were detected during these surveys, although numerous cowbirds were documented. Surveys were not conducted in 1997. Surveys have not been conducted along the Gila River by any agency upstream from the action area (although flycatchers were present in 1997 on the San Francisco River, which is an upstream tributary of the Gila River; Arizona Game and Fish Department 1997). However, numerous surveys have been conducted downstream from the action area. In the stretch of the Gila River from the Solomon Bridge downstream to the Pima Bridge, 3 main patches of riparian habitat supported approximately 30 birds in 1997 (Tina Lee, SWCA, personal communication, September, 1997). The Solomon Bridge is approximately 3 kilometers downstream from the action area. Further downstream, two pairs of flycatchers held territories in the vicinity of Ft. Thomas (Arizona Game and Fish Department 1997). As riparian vegetation continues to recover from a century of degradation, it is clear that flycatchers may soon colonize riparian zones in the action area (colonization may have already occurred, but lack of 1997 surveys precludes documentation).

Effects of the action

Because of the precarious state of the southwestern willow flycatcher, accumulating effects of all impacts are of concern. The expected effects of the overall proposed action result from four main categories of action:

1. Effects of clearing riparian vegetation during the construction of access roads.
2. Effects of clearing riparian vegetation during installation of self-launching riprap and gabion baskets.
3. Effects of trimming riparian vegetation along rights-of-way between some transmission structures.

4. Effects of long-term maintenance of access roads, rights-of-way, and transmission structures.

DIRECT AND INDIRECT EFFECTS: Direct effects to the flycatcher include the permanent loss or modification of approximately 1.76 ha (4.34 acres) of riparian habitat. The proposed clearing of riparian vegetation for access roads and transmission structure modification will result in permanent loss of approximately 0.32 ha (0.78 acres) of riparian habitat, while the proposed trimming of riparian vegetation along rights-of-way will result in permanent modification of approximately 1.44 ha (3.56 acres) of riparian vegetation. The proposed action will further fragment the habitat along the Gila River, thus reducing habitat quality and increasing the potential for both nest predation and nest parasitism by brown-headed cowbirds. Riparian habitat in the Southwest is naturally rare and patchy, occurring as widely-separated ribbons of forest in a primarily arid landscape. In Arizona, for example, riparian habitat comprises less than 0.5% of the landscape (Strong and Bock 1990). The actual extent of habitat suitable for the southwestern willow flycatcher is more restricted. Wide-ranging or highly mobile species that rely on naturally patchy habitats, such as the flycatcher, persist at regional scales as metapopulations, or local breeding groups that are linked together and maintained over time through immigration and emigration (Pulliam and Dunning 1995). Persistence of local breeding groups is a function of group size (number of individuals) and the ability of individuals to disperse from one breeding location to another. Fragmentation reduces the chance of an individual successfully finding suitable habitat by isolating habitat patches. Searching for increasingly isolated patches leaves individuals vulnerable to mortality from starvation or predation and can result in loss of breeding opportunities.

The removal of riparian vegetation within the project area will undoubtedly alter areas potentially usable by breeding flycatchers (assuming future colonization of the action area), resulting in reduced productivity and survivorship. Habitat loss and fragmentation combine to isolate and reduce in number and size the spaces necessary for breeding, feeding, sheltering, and migrating. Loss and reduction of space to carry out a species' life cycle increases the probability of extinction of local breeding groups, particularly those that consist of few individuals (Pulliam and Dunning 1994). Habitat loss and fragmentation ultimately reduce the viability of a metapopulation whole. Ehrlich *et al.* (1992) document the species or subspecies in North America (excluding Hawaii) that have been extirpated since 1776 as a result of habitat loss, fragmentation, or modification. They include the San Clemente Bewick's wren (*Thryomanes bewickii leucophrys*), Texas Henslow's sparrow (*Ammodramus henslowii houstonensis*), dusky seaside sparrow (*Ammodramus maritimus nigrescens*), Bachman's warbler (*Vermivora bachmanii*), and ivory-billed woodpecker (*Campephilus principalis*).

BREEDING: All construction of access roads, vegetation trimming along rights-of-way, and modifications to transmission structures are proposed to occur outside of the flycatcher breeding season (approximately April 15 to September 01). Periodic maintenance of access roads is proposed to occur at irregular intervals, but will not be performed during the breeding season.

DURATION: The proposed action will permanently render small areas unusable by flycatchers and reduce the value of adjacent habitat to an unknown degree. Continued maintenance of access roads and cleared areas around transmission structures will remove the possibility of the regeneration of flycatcher habitat at those sites.

Cumulative effects

Cumulative effects include the effects of future State, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of ESA.

It is anticipated that the ongoing private actions described in the environmental baseline will continue in the action area. Continued use of portions of the historic floodplain for agricultural purposes, coupled with loss of habitat resulting from the proposed action, is expected to continually limit the chances of successful recruitment of cottonwood and willow seedlings (Flett and Sanders 1987, Schulz and Leininger 1990).

CONCLUSION

The southwestern willow flycatcher's current status is characterized by extremely small, widely-scattered sites containing an estimated five or few territories; many locations contain single, unmated males. The small, fragmented nature of flycatcher populations makes this species vulnerable to stochastic processes alone, and the Service anticipates continued extirpation at sites containing few birds. It is the opinion of the Service that continued losses of suitable habitat, or temporary impacts that negatively affect flycatcher reproduction and survivorship can significantly reduce the reproduction, numbers, and distribution of the southwestern willow flycatcher. After reviewing the current status of the southwestern willow flycatcher, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the Dos Condados - Hackberry - Morenci transmission line structure modification and right-of-way trimming, as proposed, is not likely to jeopardize the continued existence of the southwestern willow flycatcher. AEPCO has incorporated sufficient project features including avoidance and effect minimization to avoid jeopardy to the species. No critical habitat for this species occurs in the area, so no destruction or adverse modification of critical habitat is anticipated.

INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of ESA, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species

by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be implemented by AEPCO, so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. AEPCO has a continuing duty to regulate the activity covered by this incidental take statement. If AEPCO (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

AMOUNT OR EXTENT OF TAKE

The Service anticipates that incidental take of the southwestern willow flycatcher could occur as a result of this proposed action, assuming colonization of the action area occurs. When habitat is destroyed or habitat regeneration is impeded in areas of suitable flycatcher habitat, population maintenance and expansion is precluded. Thus, young that return to breed may be unlikely to find suitable habitat or find mates. Incidental take is expected to be in the form of harassment or harm through reduction of habitat patch size by vegetation clearing and/or trimming, or reduction in productivity due to human disturbance or increased levels of cowbird parasitism. The anticipated level of incidental take of southwestern willow flycatcher cannot be quantified due to the lack of data on the numbers of flycatchers presently occurring in the action area, and the difficulty of detecting harassed or harmed flycatchers. As a surrogate measure of take, incidental take will not be exceeded if the reasonable and prudent measures with accompanying terms and conditions are implemented.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

Many of the Service's concerns about the project were addressed in the modified project description following the meeting of August 25, 1997, and thus some minimization of take

has already occurred. The Service believes the following reasonable and prudent measures are necessary and appropriate to further minimize take:

1. Conduct all proposed actions in a manner which will minimize negative impacts to the southwestern willow flycatcher during the breeding season.
2. Document presence or absence of individuals and possible take for three years to determine use of the action area by southwestern willow flycatchers.
3. Take action to prevent soil erosion in the action area to prevent unnatural loss of surrounding riparian vegetation.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of ESA, AEPCO must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are nondiscretionary. Implementation of the following terms and conditions may reveal additional information that will help to better define the extent of take and additional measures to reduce it if the action area is colonized. If this occurs, AEPCO may need to request a modification of the opinion from the Service to address this new information.

1. The following terms and conditions will implement reasonable and prudent measure number 1.

1.1) All structure modifications and trimming of vegetation along right-of-ways will be performed between September 1 and April 15 in order to avoid disturbance of resident birds which may colonize the action area. Even if no southwestern willow flycatchers are detected during surveys (see below), the area should not be disturbed during the breeding season so as to provide suitable migration and dispersal habitat.

1.2) Maintenance of gabion baskets, riprap structures, and/or transmission structures will be performed between September 1 and April 15.

1.3) Removal of new vegetation along access roads will be performed only after at least one southwestern willow flycatcher survey has been performed in the action area. If breeding pairs are present within 200 feet of an access road, vehicular traffic and mechanical trimming devices (such as chainsaws) may not be used on the access road until after September 1. Vehicular traffic will be restricted to speeds less than 5 miles per hour on access roads at all times.

2. The following terms and conditions will implement reasonable and prudent measure number 2.

2.1) Surveys for the southwestern willow flycatcher will be conducted for a minimum of 3 years in the action area AND in all suitable habitat patches within 0.5 km of the action area (to the extent allowable by surrounding landowners, starting in 1998.

Surveys will follow the revised protocol of Sogge *et al.* (1997). Note that this protocol requires performing multiple surveys in a given site within one breeding season.

2.2) All flycatcher-related surveys shall be conducted by experienced personnel that have undergone training in southwestern willow flycatcher survey methods. Training must be administered by the Arizona Game and Fish Department (AGFD) or by a designated agency approved by the AGFD.

2.3) A report summarizing results of surveys will be submitted to the Service and AGFD at the end of each breeding season. This report will also incorporate annual updates on the maintenance work and other activity in the action area.

2.4) If flycatchers are detected in the action area, AEPCO or its designated representative will contact the Service within three (3) days for discussion of possible changes to maintenance schedules.

3. The following term and condition will implement reasonable and prudent measure number 3.

3.1) AEPCO will re-seed disturbed areas (access roads and areas surrounding transmission structures) with native grasses typical of the area, in order to reduce the extent of erosion of soils. It is understood by the Service that regular maintenance activities may eliminate a portion of this vegetation cover. As previously discussed, re-seeding is not required around Structure L122 or the access road leading to Structure L122 due to lack of an underlying soil base.

To the extent that this statement concludes that take of any threatened or endangered species of migratory bird will result from the agency action for which consultation is being made, the Service will not refer the incidental take of any such migratory bird for prosecution under the MBTA of 1918, as amended (16 U.S.C. §§ 703-712), or the Bald Eagle Protection Act of 1940, as amended (16 U.S.C. §§ 668-668d), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

DISPOSITION OF DEAD, INJURED, OR SICK INDIVIDUALS OF A LISTED SPECIES.

If a dead, injured, or sick individual of a listed species is found at the project site, initial notification must be made to Service Law Enforcement, Federal Building, Room 105, 26 North McDonald, Mesa, AZ 85201 (Telephone: 602/261-6443) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the finding, a photograph of the animal, and any other pertinent information. The notification shall be sent to Law Enforcement with a copy to the AZ Ecological Services Field Office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state. If possible, the remains shall be placed with educational or research institutions holding appropriate State and Federal permits. If such institutions are not available, the information noted above shall be obtained and the carcass left in place. Arrangements regarding proper disposition of potential museum specimens shall be made with the institution prior to implementation of the action. Injured animals should be transported to

a qualified veterinarian by an authorized biologist. Should any treated animals survive, the Service shall be contacted regarding the final disposition of the animals.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of ESA directs Federal agencies to utilize their authorities to further the purposes of ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends the following actions:

1. In order to maximize conservation benefits to the southwestern willow flycatcher, cooperate with willing landowners around the action area to protect all non-federal reaches upstream and downstream, including all areas within the 100-year floodplain. Protection includes managing the areas in a manner that will enhance reproductive success of flycatchers. This includes the elimination of grazing or holding of livestock (cattle, burros, horses, llamas, etc.) in the 100-year floodplain.
2. Develop a comprehensive plan which will address southwestern willow flycatcher concerns in any areas of Arizona where transmission lines operated by AEPCO cross areas of occupied, suitable, or potential southwestern willow flycatcher habitat. This comprehensive plan could preclude multiple individual consultations on small projects, and could address multiple listed species.
3. In cooperation with the Arizona Game and Fish Department and the Service, initiate and maintain a cowbird trapping program in the action area when and if colonization of the area by flycatchers occurs. This program may reduce brood parasitism of flycatchers and other riparian bird species.


In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the actions outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a

manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation. Any questions or comments should be directed to Bob Reed or Angie Brooks of my staff.

Sincerely,


Sam F. Spiller
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ES)
Director, Arizona Game and Fish Department, Phoenix, AZ (Attn: T. McCarthy)

LITERATURE CITED

- Aldrich, J. 1951. A review of the races of the Traill's flycatcher. *Wilson Bulletin* 63:192-197.
- American Ornithologists' Union. 1957. Checklist of North American birds. 5th ed. Lord Baltimore Press, Baltimore, Maryland. 691 pp.
- American Ornithologists' Union. 1983. Checklist of North American birds. 6th ed. Allen Press, Lawrence, Kansas. 877 pp.
- Arizona Game and Fish Department. 1996. Wildlife of special concern in Arizona (Draft). Nongame and Endangered Wildlife Program. Arizona Game and Fish Department, Phoenix, Arizona. 23 pp.
- Behle, W.H. and H.G. Higgins. 1959. The birds of Glen Canyon. Pages 107-133, in A.M. Woodbury ed. Ecological Studies of Flora and Fauna in Glen Canyon. University of Utah.
- Bent, A.C. 1963. Life histories of North American flycatchers, larks, swallows and their allies. Dover Press, New York, New York. 555 pp. (Reprint of original 1942, U.S. National Museum Bulletin).
- Blake, E.R. 1953. Birds of Mexico. University of Chicago Press, Chicago, Illinois. 644 pp.
- Brittingham, M.C. and S.A. Temple. 1983. Have cowbirds caused forest songbirds to decline? *BioScience* 33:31-35.
- Brown, B.T. 1988a. Breeding Ecology of a Willow Flycatcher Population Along the Colorado River in Grand Canyon, Arizona. *Western Birds* 19:25-33.
- Brown, B.T. 1988b. Monitoring bird population densities along the Colorado River in Grand Canyon: 1987 breeding season. Final Report to the Glen Canyon Environmental Studies. Bureau of Reclamation, Salt Lake City, Utah. 26 pp.
- Brown, B.T. 1994. Rates of brood parasitism by brown-headed cowbirds on riparian passerines in Arizona. *Journal of Field Ornithology* 65:160-168.
- Browning, M.R. 1993. Comments on the taxonomy of *Empidonax traillii* (willow flycatcher). *Western Birds* 24:241-257.
- Burkham, D.E. 1970. Precipitation, streamflow, and major floods at selected sites in the Gila River drainage above Coolidge Dam, Arizona. U.S. Geological Survey Professional paper 655-B. Washington D.C. 33 pp.

Burkham, D.E. 1972. Channel changes of the Gila River in Safford Valley, Arizona 1846-1970. U.S. Geological Survey Professional Paper 655-G. Washington, D.C. 24 pp.

California Department of Fish and Game. 1992. State and Federal endangered and threatened animals of California (Revised July 1992). California Department of Fish and Game, Natural Heritage Division, Sacramento, California. 13 pp.

Camp Pendleton Marine Corps Base. 1994. Biological Assessment: Riparian and Estuarine Habitat.

Cooper, C. 1996. Summary of 1995 surveys for willow flycatchers in New Mexico. Contract 96-516.51. New Mexico Department of Game and Fish. 27 pp.

Corman, T.E., C.E. Paradzick, J.W. Rourke, S.J. Sferra, J.A. Spencer, and M.W. Sumner. 1996. Arizona Partners In Flight southwestern willow flycatcher survey 1993-1996 summary report. Draft Technical Report. Nongame and Endangered Wildlife Program. Arizona Game and Fish Department, Phoenix, AZ. 97 pp.

Ehrlich, P.R., D.S. Dobkin, and D. Wheye. 1992. Birds in jeopardy. The imperiled and extinct birds of the United States and Canada, including Hawaii, and Puerto Rico. Stanford University Press, Stanford, CA. 259 pp.

Flett, M.A. and S.D. Sanders. 1987. Ecology of a Sierra Nevada population of willow flycatchers. *Western Birds* vol. 18 no.1.

Gill, F.B. 1990. Ornithology. W.H. Freeman and Company, New York, New York. 660 pp.

Gorski, L.J. 1969. Traill's Flycatchers of the "fitz-bew" songform wintering in Panama. *The Auk* 86:745-747.

Graf, W.L., D.T. Patten and B. Turner. 1983. Issues concerning phreatophyte clearing, revegetation, and water savings along the Gila River, Arizona. Report submitted in partial fulfillment of U.S. Army Corps of Engineers Contract DACW09-83-M-2623. Prepared by Arizona State University, Tempe, Arizona. 69 pp.

Griffith, J.T. and J.C. Griffith. 1995. The status of the Southwestern Willow flycatcher at the upper San Luis Rey River, San Diego County, California, in 1994. Final Report to the U.S. Forest Service, Palomar Ranger District, No. 43-91U4-4-0271.

Grinnell, J. and A.H. Miller. 1944. The distribution of the birds of California. Pacific Coast Avifauna No. 27. Cooper Ornithological Society, Berkeley, California.

- Hanski, I., A. Moilanen, and M. Gyllenberg. 1996. Minimum viable metapopulation size. *American Naturalist* 147:527-541.
- Harris, J.H. 1991. Effects of brood parasitism by brown-headed cowbirds on willow flycatcher nesting success along the Kern River, California. *Western Birds* 22:13-26.
- Harris, J.H., S.D. Sanders, and M.A. Flett. 1987a. The status and distribution of the willow flycatcher (*Empidonax traillii*) in the Sierra Nevada. California Department of Fish and Game Wildlife Management Branch Administrative Report 87-2., .
- Harris, J.H., S.D. Sanders, and M.A. Flett. 1987b. Willow flycatcher surveys in the Sierra Nevada. *Western Birds* 18:27-36.
- Harrison, H.H. 1979. A field guide to western birds' nests of 520 species found breeding in the United States west of the Mississippi River. Houghton Mifflin Company, Boston, Massachusetts. 279 pp.
- Holmgren, M.A. and P.W. Collins. 1995. Interim report on the distribution, breeding status, and habitat associations of seven federal special-status bird species and Brown-headed Cowbirds at Vandenberg Air Force Base, Santa Barbara County, California. Museum of Systematics and Ecology, Department of Ecology, Evolution, and Marine Biology, University of California: Santa Barbara, California. Environmental Report No. 3.
- Howell, S.N.G. and S. Webb. 1995. A guide to the birds of Mexico and northern Central America. Oxford University Press, New York, New York. 851 pp.
- Hubbard, J.P. 1987. The Status of the Willow Flycatcher in New Mexico. Endangered Species Program, New Mexico Department of Game and Fish, Sante Fe, New Mexico. 29 pp.
- Hull, T. and D. Parker. 1995. The Gila Valley revisited: 1995 survey results of willow flycatchers found along the Gila River near Gila and Cliff, Grant County, New Mexico. Prepared by Applied Ecosystem Management, Inc. for the Phelps Dodge Corporation. 25 pp.
- King, J.R. 1955. Notes on the life history of Traill's Flycatcher (*Empidonax traillii*) in southeastern Washington. *The Auk* 72:148-173.
- Kus, J. 1995. The status of the least Bell's vireo and southwestern willow flycatcher at Camp Pendleton, California, in 1995. Department of Biology, San Diego State University, San Diego, California.
- Ligon, J.S. 1961. New Mexico Birds and where to find them. The University of New Mexico Press, Albuquerque, New Mexico.

- Lilburn, S.T. and Associates. 1984. Working paper. Environmental inventory and future without project Gila River, Arizona. Contract No. DACW09-83-M-2594. Prepared for the U.S. Army corps of Engineers, Los Angeles District. 167 pp.
- Mayfield, H. 1977a. Brood parasitism: Reducing interactions between Kirtland's warblers and brown-headed cowbirds. Pages 85-91, in S.A. Temple ed. *Endangered Birds: Management techniques for preserving threatened species*. University of Wisconsin Press, Madison, Wisconsin.
- Mayfield, H. 1977b. Brown-headed cowbird: agent of extermination? *American Birds* 31:107-113.
- Maynard, W.R. 1995. Summary of 1994 survey efforts in New Mexico for southwestern willow flycatcher (*Empidonax traillii extimus*). Contract # 94-516-69. New Mexico Department of Game and Fish, Sante Fe, New Mexico. 48 pp.
- McCabe, R.A. 1991. The little green bird: ecology of the willow flycatcher. Palmer Publications, Inc., Amherst, Wisconsin. 171 pp.
- McDonald, K.P., J. Snider, L.C. Peterson, M. St. Germain, and S. Staats. 1995. Results of 1995 Southwestern Willow Flycatcher surveys in the Virgin River drainage and southern Utah. Utah Division of Wildlife Resources: Cedar City, Utah. Publication No. 95-17.
- McGeen, D.S. 1972. Cowbird-host relationships. *The Auk* 89:360-380.
- Monson, G. and A.R. Philips. 1981. Annotated checklist of the birds of Arizona. The University of Arizona Press, Tucson, Arizona. 240 pp.
- Muiznieks, B.D., T.E. Corman, S.J. Sferra, M.K. Sogge, and T.J. Tibbitts. 1994. Arizona Partners In Flight 1993 southwestern willow flycatcher survey. Technical Report 52. Arizona Game and Fish Department, Nongame and Endangered Wildlife Program, Phoenix, Arizona. 25 pp.
- New Mexico Department of Game and Fish. 1988. Handbook of species endangered in New Mexico., Sante Fe, New Mexico.
- Olmstead, F.H. 1919. Gila River flood control. Letter from the Secretary of the Interior. A report on flood control of the Gila River in Graham County, Arizona. Document NO. 436, Government Printing Office, Washington, D.C. 94 pp.
- Oberholser, H.C. 1974. The bird life of Texas. University of Texas Press, Austin, TX. 1069 pp.

- Paxton, E., J. Owen, and M. Sogge. 1996. Southwestern willow flycatcher response to catastrophic habitat loss. U.S.G.S. Colorado Plateau Research Station/Northern Arizona University report. 12 pp.
- Peterson, J.R. and M.K. Sogge. 1996. Distribution and breeding productivity of the southwestern willow flycatcher along the Colorado River in the Grand Canyon - 1996. Summary Report. Grand Canyon National Park, Grand Canyon, AZ, and National Biological Service Colorado Plateau Research Station/Northern Arizona University. 30 pp.
- Peterson, R.T. 1990. A field guide to western birds. 3rd ed. Houghton Mifflin Company, Boston, Massachusetts. 432 pp.
- Peterson, R.T. and E. Chalif. 1973. A field guide to Mexican birds. Houghton Mifflin Company, Boston, Massachusetts. 432 pp.
- Phillips, A.R. 1948. Geographic variation in *Empidonax traillii*. *The Auk* 65:507-514.
- Phillips, A., J. Marshall, and G. Monson. 1964. The birds of Arizona. University of Arizona Press, Tucson, Arizona. 212 pp.
- Pulliam, H.R. 1988. Sources, sinks, and population regulation. *American Naturalist* 132:652-661.
- Pulliam, H.R. and J.B. Dunning. 1994. Demographic processes: Population dynamics on heterogeneous landscapes. Pp. 179-208, in G.K. Meffe and C.R. Carroll (eds), *Principles of Conservation Biology*. Sinauer Associates, Inc., Sunderland, MA.
- Ridgely, R.S. and G. Tudor. 1994. *The Birds of South America: Suboscine Passerines*. University of Texas Press, Austin, Texas.
- San Diego Natural History Museum. 1995. *Empidonax traillii extimus* in California. The willow flycatcher workshop. 17 November 1995. 66 pp.
- Schlorff, R.W. 1990a. Petition to the State of California Fish and Game Commission to List the Willow Flycatcher as Endangered.
- Schlorff, R.W. 1990b. Status Review of the Willow Flycatcher (*Empidonax traillii*) in California. Report to the California Department of Fish and Game, Department Candidate Species Status Report 90-1, Sacramento, California. 23 pp.
- Schulz, T. and W. Leininger. 1990. Differences in riparian vegetation structure between grazed areas and exclosures. *J. Range Management* 43(4):295-299.

- Sferra, S.J., Corman, T.E., C.E. Paradzick, J.W. Rourke, J.A. Spencer, and M.W. Sumner. 1997. Arizona Partners In Flight southwestern willow flycatcher survey 1993-1996 summary report. Technical Report. Nongame and Endangered Wildlife Program. Arizona Game and Fish Department, Phoenix, AZ. 97 pp.
- Sferra, S.J., R.A. Meyer, and T.E. Corman. 1995. Arizona Partners In Flight 1994 southwestern willow flycatcher survey. Final Technical Report 69. Arizona Game and Fish Department, Nongame and Endangered Wildlife Program, Phoenix, Arizona. 46 pp.
- Skaggs, R.W. (1996). Population size, breeding biology, and habitat of willow flycatchers in the Cliff-Gila Valley, New Mexico 1995. Final Report. New Mexico Department of Game and Fish: Glenwood, New Mexico. 38 pp.
- Sogge, M.K. 1995a. Southwestern willow flycatcher (*Empidonax traillii extimus*) monitoring at Tuzigoot National Monument. 1995 progress report to the National Park Service. National Biological Service Colorado Plateau Research Station/Northern Arizona University, Flagstaff, Arizona. 20 pp.
- Sogge, M.K. 1995b. Southwestern willow flycatcher surveys along the San Juan River, 1994 - 1995. Final report to the Bureau of Land Management, San Juan Resource Area. National Biological Service Colorado Plateau Research Station/Northern Arizona University, Flagstaff, Arizona. 27 pp.
- Sogge, M.K. 1995c. Southwestern willow flycatchers in the Grand Canyon. Pages 89-91, in E.T. LaRoe, G.S. Farris, C.E. Puckett, P.D. Doran, and M.J. Mac eds. Our living resources: a report to the nation on the distribution, abundance, and health of U.S. plants, animals, and ecosystems. Department of the Interior, National Biological Service, Washington, DC.
- Sogge, M.K., R.M. Marshall, S.J. Sferra and T.J. Tibbitts. 1997. A southwestern willow flycatcher natural history summary and survey protocol. National Park Service Technical Report NPS/NAUCPRS/NRTR-97/12. 39 pp.
- Sogge, M.K. and T.J. Tibbitts. 1992. Southwestern willow flycatcher (*Empidonax traillii extimus*) surveys along the Colorado River in Grand Canyon National Park and Glen Canyon National Recreation Area. National Park Service Cooperative Park Studies Unit/Northern Arizona University, Flagstaff, Arizona. 43 pp.
- Sogge, M.K. and T.J. Tibbitts. 1994. Distribution and status of the southwestern willow flycatcher along the Colorado river in the Grand Canyon - 1994. Summary Report. National Biological Survey Colorado Plateau Research Station/Northern Arizona University, Flagstaff, Arizona. 37 pp.

- Sogge, M.K., T.J. Tibbitts, and S.J. Sferra. 1993. Status of the southwestern willow flycatcher along the Colorado River between Glen Canyon Dam and Lake Mead - 1993. Summary Report. National Park Service Cooperative Park Studies Unit/Northern Arizona University, U.S. Fish and Wildlife Service, and Arizona Game and Fish Department., Flagstaff, Arizona. 69 pp.
- Sogge, M.K., T.J. Tibbitts, C. van Riper III, and T. May. 1995. Status of the southwestern willow flycatcher along the Colorado River in Grand Canyon National Park. National Biological Service, Colorado Plateau Research Station Northern Arizona University, Flagstaff, Arizona. 26 pp.
- Spencer, J.A., S.J. Sferra, T.E. Corman, J.W. Rourke, and M.W. Sumner. 1996. Arizona Partners In Flight 1995 southwestern willow flycatcher survey. Technical Report 97, March 1996. Arizona Game and Fish Department, Phoenix, Arizona. 69 pp.
- Stiles, F.G. and A.F. Skutch. 1989. A guide to the birds of Costa Rica. Comstock, Ithaca, New York. 364 pp.
- Stransky, K. 1995. 1995 Field survey by the Colorado Division of Wildlife: Southwestern Willow Flycatcher (*Empidonax traillii extimus*).
- Strong, T.R. and C.E. Bock. 1990. Bird species distribution patterns in riparian habitats in southeastern Arizona. Condor 92:866-885.
- Tibbitts, T.J., M.K. Sogge, and S.J. Sferra. 1994. A survey protocol for the southwestern willow flycatcher (*Empidonax traillii extimus*). Technical Report NPS/NAUCPRS/NRTR-94/04. National Park Service Colorado Plateau Research Station, Flagstaff, Arizona. 24 pp.
- Unitt, P. 1984. The birds of San Diego County. *San Diego Society of Natural History*.
- Unitt, P. 1987b. *Empidonax traillii extimus*: An endangered subspecies. *Western Birds* 18:137-162.
- U.S. Fish and Wildlife Service. 1989. Notice of review: animal candidate review for listing as endangered or threatened species. *Federal Register* 54:554.
- U.S. Fish and Wildlife Service. 1993. Notice of 12-month petition finding/proposal to list *Empidonax traillii extimus* as an endangered species, and to designate critical habitat. *Federal Register* 58:39495-39522.
- U.S. Fish and Wildlife Service. 1995. Final rule determining endangered status for the southwestern willow flycatcher. *Federal Register* 60:10694-10715.

Walkinshaw, L.H. 1966. Summer biology of Traill's flycatcher. *Wilson Bulletin* 78:31-46.

Wheelock, I.G. 1912. Birds of California: an introduction to more than three hundred common birds of the state and adjacent islands. A.C. McClurg and Company, Chicago, Illinois.

Whitfield, M.J. 1990. Willow flycatcher reproductive response to brown-headed cowbird parasitism. Masters Thesis, California State University, Chico, California State University, Chico, California.

Whitfield, M.J. 1993. Brown-headed cowbird control program and monitoring for willow flycatchers, South Fork Kern River, California. Draft report to California Department of Fish and Game, Contract #FG 2285., Weldon, California. 11 pp.

Whitfield, M.J. 1994. A brown-headed cowbird control program and monitoring for the southwestern willow flycatcher, South Fork Kern River, California, 1994. Prepared for the California Department of Fish and Game. Kern River Research Center, Weldon, California. 12 pp.

Whitfield, M.J. 1995. Results of a brown-headed cowbird control program for the southwestern willow flycatcher. in S. Rothstein, S. Robinson, S. Sealy, T. Cook, and J.M.N. Smith eds. The ecology and management of cowbirds. University of Texas Press, Austin, Texas.

Whitfield, M.J. and C.M. Strong. 1995. A brown-headed cowbird control program and monitoring for the southwestern willow flycatcher, South Fork Kern River, California. California Department of Fish and Game, Bird and Mammal Conservation Program Report 95-4, Sacramento, California. 17 pp.

Willard, F.C. 1912. A week afield in southern Arizona. *The Condor* 14:53-63.

Willet, G. 1912. Birds of the Pacific slope of southern California. *Pacific Coast Avifauna* 7.

Willet, G. 1933. A revised list of the birds of southwestern California. *Pacific Coast Avifauna* 21.